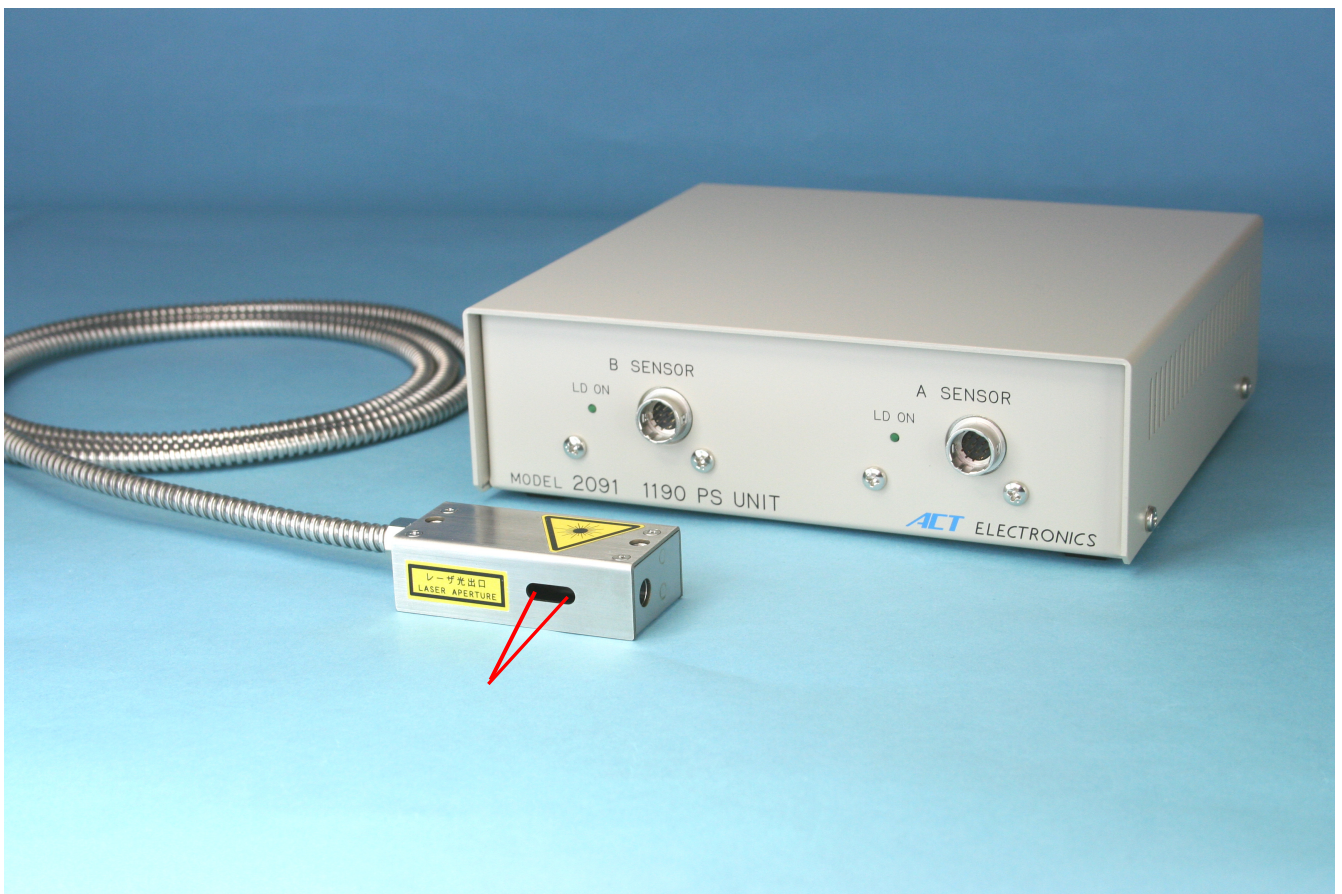# MODEL 1191

DOPPLER SENSOR

SUPER SMALL DOPPLER SENSOR

Super Small, Aseismic, and high-temperature-tolerant Sensor

Directly mounted on an engine of an automobile
For **"actual measurement while driving"** that never before be possible

Features

The MODEL 1191 is a Super Small Doppler Sensor, which maintains its performance quality although the sensor is microminiaturized than ever before.

This sensor has aseismic design and internal cooling system which are available for "accrual measurement while driving" of velocity, wow-flutter, and slip rate, by mounting it on an engine of an automobile, that never before be possible.

And the signal processor MODEL 2022 is common to other ACT Doppler Sensor. Therefore it is available for every measurement just by replacing a sensor.

This unprecedented small size sensor is useful for more various measurement.

Specifications

Doppler Sensor MODEL 1191

Measurement system	Laser Doppler system, back-scattering differential type	
MODEL 1191 Super small L=40mm	Focus distance	Optimal position at 40±4 ㎜
	Measurement range 7.5m/min to 6000m/min (0.13～100m/sec)	
Accuracy	Within ±0.2%	
Power supply	Supplied from MODEL 2091	
Laser output	Class3B ・20mWMAX・CW・Laser Diode 690nm	
Beam spot	Approx: 1mm wide by 3mm oval	
Dimensions, Weight	28(W)x18(H)x60(D)mm, less than 0.1kg	

Power Supply Unit MODEL 1190PSUnit（MODEL 2091）

Others

Internal cooling system by using compressed air
(Operable up to 100 degree temperature)
Aseismic design available for direct-mounting on an engine.
(more than at 200Hz, removes vibrations by using vibration removal rubber)

MODEL 2022 General Specifications

Power supply	AC100－240V, 50/60Hz, 200VAmax
Allowable power fluctuation	±10%
Electric shock protection	Class I
Allowable altitude	2000m max.
Pollution degree	Degree 2
Set category	Category II
Operating temperature range	0 to 40℃, without condensation
Storage temperature range	－10 to 60℃, without condensation
Dimensions and weights	426(W)x148(H)x400(D)mm, Approx, 11kg

Signal Processor MODEL 2022 <Velocity measurement section> (Both channels)

Measurement range	4.3m/min to 3500m/min　Using MODEL 1111 7.5m/min to 6000m/min　Using MODEL 1191 or 1121	
Display	Digital indication in 5 decimal digits	
	Unit	m/min, m/sec
	Cycle	Approx, 0.2sec, 1sec
	Averaging	2 to 20 times moving average
Accuracy	Depends on Doppler Sensor	
Velocity output (F/V output)	Voltage	0 to 10V Full scale adjustable
	Voltage accuracy	Within ±3% at full scale
	Low-pass filter	5Hz to 5kHz　selectable
	Impedance	1kΩ
Average velocity output （D/A output）	12bits D/A output	
	Voltage	0 to 10V Full scale adjustable
	Voltage accuracy	Within ±1% at full scale
	Sampling rate	50ms, 500ms
	Averaging	2 to 99 times moving average

<Wow & Flutter measurement section> (Both channels)

Measurement range	0.15 to 10% rms (referred to a band below　Fd/1000(Hz)) (0.001% to 10% when FFT is employed)	
Range	Five ranges of 0.1，0.3，1，3，and 10%	
Indication	rms, p-p	
Accuracy	Within ± 5% of full scale of each range	
Frequency band	0.5Hz to 5kHz (The low-pass filter attenuates frequencies higher than the upper-limit frequency.)	
Low-pass filter	Same as F/V output	
Wow-Flutter output (W&F output)	Voltage	1 V per full scale of each range
	Accuracy	Within ±5% of full scale
	Outputimpedance:	1kΩ

Velocity operation: Calculates and displays the difference and ratio of average velocity.

Wow-flutter operation: Calculates and displays the sum and difference of wow-flutter in real time.

Calculation output: Outputs the result of velocity and wow-flutter calculation in real time. (Delta VELO output and MATH output)